



[4910-13-P]

**DEPARTMENT OF TRANSPORTATION**

**Federal Aviation Administration**

**14 CFR Part 39**

**[Docket No. FAA-2016-8836; Directorate Identifier 2016-NE-17-AD; Amendment 39-18815; AD 2017-05-05]**

**RIN 2120-AA64**

**Airworthiness Directives; Pratt & Whitney Division Turbofan Engines**

**AGENCY:** Federal Aviation Administration (FAA), DOT.

**ACTION:** Final rule.

**SUMMARY:** We are adopting a new airworthiness directive (AD) for all Pratt & Whitney Division (PW) PW4074, PW4074D, PW4077, PW4077D, PW4084D, PW4090, and PW4090-3 turbofan engines. This AD was prompted by an uncontained failure of a high-pressure turbine (HPT) hub during takeoff. This AD requires an inspection to measure the surface condition of the aft side web/rim fillet of HPT 1<sup>st</sup> stage hubs and removal from service of hubs that fail inspection. We are issuing this AD to correct the unsafe condition on these products.

**DATES:** This AD is effective [INSERT DATE 35 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

The Director of the Federal Register approved the incorporation by reference of a certain publication listed in this AD as of [INSERT DATE 35 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

**ADDRESSES:** For service information identified in this final rule, contact Pratt & Whitney Division, 400 Main St., East Hartford, CT 06118; phone: 800-565-0140; fax: 860-565-5442. You may view this service information at the FAA, Engine & Propeller Directorate, 1200 District Avenue, Burlington, MA. For information on the availability of

this material at the FAA, call 781-238-7125. It is also available on the internet at <http://www.regulations.gov> by searching for and locating Docket No. FAA-2016-8836.

### **Examining the AD Docket**

You may examine the AD docket on the Internet at <http://www.regulations.gov> by searching for and locating Docket No. FAA-2016-8836; or in person at the Docket Management Facility between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays. The AD docket contains this AD, the regulatory evaluation, any comments received, and other information. The address for the Docket Office (phone: 800-647-5527) is Document Management Facility, U.S. Department of Transportation, Docket Operations, M-30, West Building Ground Floor, Room W12-140, 1200 New Jersey Avenue SE., Washington, DC 20590.

**FOR FURTHER INFORMATION CONTACT:** Jo-Ann Theriault, Aerospace Engineer, Engine Certification Office, FAA, Engine & Propeller Directorate, 1200 District Avenue, Burlington, MA 01803; phone: 781-238-7105; fax: 781-238-7199; email: [jo-ann.theriault@faa.gov](mailto:jo-ann.theriault@faa.gov).

### **SUPPLEMENTARY INFORMATION:**

#### **Discussion**

We issued a notice of proposed rulemaking (NPRM) to amend 14 CFR part 39 by adding an AD that would apply to PW PW4074, PW4074D, PW4077, PW4077D, PW4084, PW4084D, PW4090, and PW4090-3 turbofan engines. The NPRM published in the Federal Register on October 26, 2016 (81 FR 74358). The NPRM was prompted by an uncontained failure of an HPT hub during takeoff. The NPRM proposed to require an inspection to measure the surface condition of the aft side web/rim fillet of HPT 1<sup>st</sup> stage hubs and removal from service of hubs that fail inspection. We are issuing this AD to prevent failure of the HPT 1<sup>st</sup> stage hub, uncontained hub release, damage to the engine, and damage to the airplane.

## **Comments**

We gave the public the opportunity to participate in developing this AD. The following presents the comments received on the NPRM and the FAA's response to each comment.

### **Request for Previous Credit**

All Nippon Airways (ANA), Japan Airlines (JAL), PW, and United Airlines (UAL) requested that we give credit for hubs inspected per PW Special Instruction (SI) No. 250F-16, dated June 22, 2016 or PW SI No. 250F-16, Revision A, dated July 14, 2016.

We agree. We added a Credit for Previous Actions paragraph to give credit for inspections accomplished per these SIs.

### **Request to Provide Risk Analysis**

ANA requested that information related to the risk analysis and likelihood of failure that provided the basis of this AD be added to the compliance section of this AD. ANA noted that the root cause of this event is a machining anomaly and it would like to see the FAA's estimate on how a machining anomaly could lead to uncontained failure of the HPT hub.

We disagree. The purpose of the compliance section of an AD is to provide the necessary actions needed to provide an acceptable level of safety. The FAA does not typically provide risk assessments in an AD as this information is often, as is the case with this AD, considered proprietary. FAA's general methodology for risk analysis can be found in FAA AC 39-8, "Continued Airworthiness Assessments of Powerplant and Auxiliary Power Unit Installations of Transport Category Airplanes." We did not change this AD.

### **Request to Confirm Definition**

ANA requested that we confirm that replacement of the main gearbox or angle gearbox is not defined as a major flange separation, which is the basis for an “engine shop visit,” as defined in the NPRM (81 FR 74358, October 26, 2016).

We agree. Replacement of the main gearbox or angle gearbox replacement does not require major flange separation and does not constitute an “engine shop visit.” We note, however, that this AD no longer requires inspections at engine shop visits and we removed this definition from this AD.

### **Request to Remove New HPT Hubs from Inspection Requirements**

ANA, JAL, and PW requested that paragraph (e) of this AD not require inspection for new HPT 1<sup>st</sup> stage hubs. These hubs include HPT 1<sup>st</sup> stage hubs marked with detail revision number part number (P/N) 55L901 Rev B or P/N 55L801 Rev E, or subsequent revision letters. The commenters indicated that per PW Service Bulletin (SB) PW4G-112-72-342, dated September 23, 2016, HPT hubs marked with these detail revision numbers do not need to be inspected because of improvements to PW’s inspection program.

We disagree. The root cause of the HPT hub failure is a machining anomaly in the aft web/rim fillet area of the HPT 1<sup>st</sup> stage hub. Although manufacturing changes are being made to reduce the chance of this defect occurring, these changes have not been fully implemented. New production parts, therefore, are still susceptible to this defect. We did not change this AD.

### **Request to Revise Compliance Time for Previously-Inspected Hubs**

ANA requested that for hubs that have been previously inspected, but not marked, the compliance should be at the next piece-part exposure rather than at next engine shop visit. ANA indicated that PW SI No. 250F-16, dated June 22, 2016, and PW SI No. 250F-16, Revision A, dated July 14, 2016, do not require marking of the hubs after inspection.

Part A, paragraph 2.C., and Part B, paragraph 1.C. of PW SB PW4G-112-72-342, dated September 23, 2016, however, require marking the parts after inspection. ANA indicated that it has some parts that have been inspected but not marked. ANA commented that the inspection interval for HPT 1<sup>st</sup> stage hubs that have already been inspected should be at the next piece-part exposure.

We disagree. This AD requires a one-time replication inspection of HPT 1<sup>st</sup> stage hubs for machining mismatch in the aft web/rim fillet. Hubs that have passed this inspection do not require re-inspection. For those parts that were inspected using PW SI No. 250F-16, dated June 22, 2016, or PW SI No. 250F-16, Revision A, dated July 14, 2016, we are providing credit for that inspection provided the hubs passed the inspection. We did not change this AD based on this comment.

#### **Request to Limit Applicability by Serial Number**

UAL requested that a list of affected serial numbers be added to the applicability section of this AD. UAL commented that the part revision letter markings can wear over time and that revision numbers are not listed on the FAA Form 8130.

We disagree. This AD applies to all PW PW4074, PW4074D, PW4077, PW4077D, PW4084D, PW4090, and PW4090-3 turbofan engines. The applicability of this AD is not limited by part or serial number. We did not change this AD.

#### **Request to Mark HPT Hubs that Have Passed Inspection**

PW requested that the PW SB PW4G-112-72-342, dated September 23, 2016, be marked on HPT 1<sup>st</sup> stage hubs that pass the inspection required by this AD. This would make the AD consistent with this SB, which instructs operators to mark the SB number on the front turbine hub assembly.

We disagree. This AD requires hub inspections but does not require specific part markings or record-keeping procedures. If operators can show that hubs have been previously inspected and passed this inspection, then they have complied with this AD.

Each operator has the responsibility to establish its own record-keeping procedures. We did not change this AD.

#### **Request to Define Compliance by Engine Model**

UAL requested that the compliance section of this AD identify that the Accomplishment Instructions, Part A, of PW SB PW4G-112-72-342, dated September 23, 2016, apply to PW4074D, PW4077D, PW4084D, PW4090, and PW4090-3 engine models and the Accomplishment Instructions, Part B, of this SB apply only to PW4074 and PW4077 engine models.

We agree. We determined that revising the compliance requirements to make these specific to each group of engine models will make them clearer to the operators. We revised the compliance section of this AD to clarify that Part A of the Accomplishment Instructions is used to do the inspection for PW4074D, PW4077D, PW4084D, PW4090, and PW4090-3 engine models, while Part B is used for PW4074 and PW4077 engine models.

#### **Request to Revise Compliance Schedule**

PW, UAL, and JAL requested that we revise the compliance schedule to match the requirements of PW SB PW4G-112-72-342, dated September 23, 2016. PW indicated that the compliance schedule in this SB has been validated by a PW risk assessment. UAL indicated there are instances when an engine major mating flange is separated only to address a different engine module and the HPT is not exposed during these times.

We agree. We find that the compliance intervals suggested by the commenters still maintain an acceptable level of safety. We changed this AD by revising the time to perform the inspection from at the “next engine shop visit” to either the “next time the engine is disassembled sufficiently to expose the HPT module” (for PW4074D, PW4077D, PW4084D, PW4090, and PW4090-3 models) or the “next time the HPT

module is disassembled sufficiently to expose the HPT 1<sup>st</sup> stage hub” (for PW4074 and PW4077 models).

### **Support for the NPRM**

The National Transportation Safety Board commented that it supports the proposed rule as written.

### **Revision to Applicability**

We revised the applicability section of this AD by removing the PW4084 model engine. Although this engine is listed on Type Certificate Data Sheet No. E46NE, Revision 8, dated January 23, 2012, it was never produced.

### **Conclusion**

We reviewed the relevant data, considered the comments received, and determined that air safety and the public interest require adopting this AD with the changes described previously and minor editorial changes. We have determined that these minor changes:

- Are consistent with the intent that was proposed in the NPRM for correcting the unsafe condition; and
- Do not add any additional burden upon the public than was already proposed in the NPRM.

We also determined that these changes will not increase the economic burden on any operator or increase the scope of this AD.

### **Related Service Information under 1 CFR part 51**

We reviewed PW SB PW4G-112-72-342, dated September 23, 2016. This PW SB provides guidance on performing the HPT 1<sup>st</sup> stage hub web/rim fillet replication inspection and measurement for the affected HPT hubs. This service information is reasonably available because the interested parties have access to it through their normal course of business or by the means identified in the ADDRESSES section.

### Other Related Service Information

We also reviewed PW SI No. 250F-16, dated June 22, 2016, and PW SI No. 250F-16, Revision A, dated July 14, 2016. These SIs provide guidance on performing the replication inspection of the HPT 1<sup>st</sup> stage hub.

### Costs of Compliance

We estimate that this AD affects 119 engines installed on airplanes of U.S. registry.

We estimate the following costs to comply with this AD:

Estimated costs				
Action	Labor cost	Parts cost	Cost per product	Cost on U.S. operators
Inspection	1 work-hour X \$85 per hour = \$85	\$0	\$85	\$10,115

### Authority for this Rulemaking

Title 49 of the United States Code specifies the FAA's authority to issue rules on aviation safety. Subtitle I, section 106, describes the authority of the FAA Administrator. Subtitle VII: Aviation Programs, describes in more detail the scope of the Agency's authority.

We are issuing this rulemaking under the authority described in Subtitle VII, Part A, Subpart III, Section 44701: "General requirements." Under that section, Congress charges the FAA with promoting safe flight of civil aircraft in air commerce by prescribing regulations for practices, methods, and procedures the Administrator finds necessary for safety in air commerce. This regulation is within the scope of that authority because it addresses an unsafe condition that is likely to exist or develop on products identified in this rulemaking action.



## **Regulatory Findings**

This AD will not have federalism implications under Executive Order 13132. This AD will not have a substantial direct effect on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government.

For the reasons discussed above, I certify that this AD:

- (1) Is not a “significant regulatory action” under Executive Order 12866,
- (2) Is not a “significant rule” under DOT Regulatory Policies and Procedures (44 FR 11034, February 26, 1979),
- (3) Will not affect intrastate aviation in Alaska to the extent that it justifies making a regulatory distinction, and
- (4) Will not have a significant economic impact, positive or negative, on a substantial number of small entities under the criteria of the Regulatory Flexibility Act.

## **List of Subjects in 14 CFR Part 39**

Air transportation, Aircraft, Aviation safety, Incorporation by reference, Safety.

## **Adoption of the Amendment**

Accordingly, under the authority delegated to me by the Administrator, the FAA amends 14 CFR part 39 as follows:

### **PART 39 - AIRWORTHINESS DIRECTIVES**

- 1. The authority citation for part 39 continues to read as follows:

Authority: 49 U.S.C. 106(g), 40113, 44701.

#### **§ 39.13 [Amended]**

- 2. The FAA amends § 39.13 by adding the following new airworthiness directive (AD):

2017-05-05 **Pratt & Whitney Division**: Amendment 39-18815; Docket No. FAA-2016-8836; Directorate Identifier 2016-NE-17-AD.

**(a) Effective Date**

This AD is effective [INSERT DATE 35 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

**(b) Affected ADs**

None.

**(c) Applicability**

This AD applies to all Pratt & Whitney Division (PW) PW4074, PW4074D, PW4077, PW4077D, PW4084D, PW4090, and PW4090-3 turbofan engines.

**(d) Unsafe Condition**

This AD was prompted by an uncontained failure of a high-pressure turbine (HPT) hub during takeoff. We are issuing this AD to prevent failure of the HPT 1<sup>st</sup> stage hub, uncontained hub release, damage to the engine, and damage to the airplane.

**(e) Compliance**

Comply with this AD within the compliance times specified, unless already done.

(1) After the effective date of this AD, perform the HPT 1<sup>st</sup> stage hub web/rim fillet replication inspection and measurement as follows:

(i) For PW4074D, PW4077D, PW4084D, PW4090, and PW4090-3 engine models, the next time the engine is disassembled sufficiently to expose the HPT module, use the Accomplishment Instructions, Part A, paragraphs 2.A. and 2.B.(1) through 2.B.(4) of PW Service Bulletin (SB) PW4G-112-72-342, dated September 23, 2016, to do the inspection.

(ii) For PW4074 and PW4077 engine models, the next time the HPT module is disassembled sufficiently to expose the HPT 1<sup>st</sup> stage hub, use the Accomplishment Instructions Part B, paragraphs 1.A. and 1.B.(1) through 1.B.(4) of PW SB PW4G-112-72-342, dated September 23, 2016, to do the inspection.

(2) If the hub fails the inspection, remove the hub from service before further flight and replace with a part eligible for installation.

**(f) Installation Prohibition**

After the effective date of this AD, do not install, or re-install into any engine, any HPT 1<sup>st</sup> stage hub that has not been inspected and passed the inspection required by paragraph (e) of this AD.

**(g) Credit for Previous Actions**

You may take credit for the replication inspection of the HPT 1<sup>st</sup> stage hub that is required by paragraph (e)(1) of this AD, if you performed the inspection before the effective date of this AD using PW Special Instruction (SI) No. 250F-16, dated June 22, 2016, or PW SI No. 250F-16, Revision A, dated July 14, 2016.

**(h) Alternative Methods of Compliance (AMOCs)**

The Manager, Engine Certification Office, FAA, may approve AMOCs for this AD. Use the procedures found in 14 CFR 39.19 to make your request. You may email your request to: ANE-AD-AMOC@faa.gov.

**(i) Related Information**

(1) For more information about this AD, contact Jo-Ann Theriault, Aerospace Engineer, Engine Certification Office, FAA, Engine & Propeller Directorate, 1200 District Avenue, Burlington, MA 01803; phone: 781-238-7105; fax: 781-238-7199; email: jo-ann.theriault@faa.gov.

(2) PW SI No. 250F-16, dated June 22, 2016, and PW SI No. 250F-16, Revision A, dated July 14, 2016, which are not incorporated by reference, can be obtained from PW using the contact information in paragraph (j)(3) of this AD.

**(j) Material Incorporated by Reference**

(1) The Director of the Federal Register approved the incorporation by reference (IBR) of the service information listed in this paragraph under 5 U.S.C. 552(a) and 1 CFR part 51.

(2) You must use this service information as applicable to do the actions required by this AD, unless the AD specifies otherwise.

(i) Pratt & Whitney Division Service Bulletin PW4G-112-72-342, dated September 23, 2016.

(ii) Reserved.

(3) For PW service information identified in this AD, contact Pratt & Whitney Division, 400 Main St., East Hartford, CT 06118; phone: 800-565-0140; fax: 860-565-5442.

(4) You may view this service information at the FAA, Engine & Propeller Directorate, 1200 District Avenue, Burlington, MA. For information on the availability of this material at the FAA, call 781-238-7125.

(5) You may view this service information at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202-741-6030, or go to: <http://www.archives.gov/federal-register/cfr/ibr-locations.html>.

Issued in Burlington, Massachusetts, on February 27, 2017.

Robert J. Ganley,  
Acting Manager, Engine & Propeller Directorate,  
Aircraft Certification Service.

[FR Doc. 2017-04627 Filed: 3/8/2017 8:45 am; Publication Date: 3/9/2017]